

# PATENT ABSTRACTS OF JAPAN

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(71)Applicant : KAWASAKI STEEL CORP

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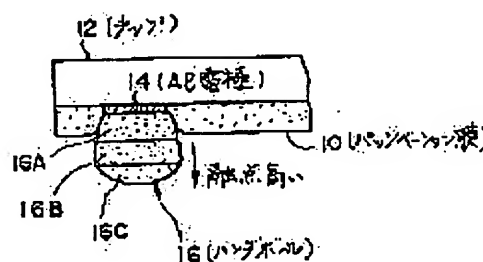
(72)Inventor : OGAWA KAZUYOSHI

## (54) SEMICONDUCTOR DEVICE AND ITS MANUFACTURE

### (57)Abstract:

**PURPOSE:** To relieve the nonuniformity of heat applied to a solder ball formed on an LSI chip at the time of the thermocompression bonding between a wiring and the LSI chip, improve the connection between the wiring and the chip and avoid a defective connection by a method wherein the solder ball is composed of the multilayer structure of different types of solder.

**CONSTITUTION:** A solder ball 16 formed on a chip is composed of the multilayer structure of solder 16A, solder 16B and solder 16C having different melting point. The melting point of the inner side solder is lower than the melting point of the surface side solder, i.e.,  $16a < 16B < 16C$ , and the larger the distance between the solder and the chip, the higher the melting point of the solder to melt the solder ball 16 uniformly. In order to obtain the multilayer solder ball, various types of solder containing, for instance, different contents of silicon, etc., are prepared and the technology of depositing an Al wiring on the chip can be utilized. Thus, by melting the solder ball 16 uniformly, the connection between the chip and the wiring can be improved.



## LEGAL STATUS

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**PATENT ABSTRACTS OF JAPAN**(11)Publication number : **54-050269**(43)Date of publication of application : **20.04.1979**

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**H01L 23/12**(21)Application number : **52-117167**(71)Applicant : **NEC HOME ELECTRONICS LTD**(22)Date of filing : **28.09.1977**(72)Inventor : **IMAI KOICHI****(54) SEMICONDUCTOR DEVICE****(57)Abstract:**

**PURPOSE:** To mount pellets to a substrate by sandwiching a high melting point solder layer with low melting point solder layers.

**CONSTITUTION:** Low melting point solder layers 2b, 2b' of 200 to 220°C in melting point mainly composed of silver and tin are laminated on the front and back of a high melting point solder layer 2a of 300 to 350°C in melting point mainly composed of silver, tin and lead. When the solder layers 2 are heated at 200 to 220°C on a substrate 1, a pellet 3 is bonded at a uniform thickness by the high temperature solder layer 2a, thus it does not become brittle owing to thermal fatigue despite long term operation

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